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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/775,368	02/01/2001	Paul Joseph Stewart	200-1451	8120

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EXAMINER	
NELSON, ALECIA DIANE	

ART UNIT	PAPER NUMBER
2629	

DATE MAILED: 03/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/775,368	STEWART ET AL.	
	Examiner	Art Unit	
	Alecia D. Nelson	2675	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. ***Claims 1-20*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Shih et al. (U.S. Patent No. 6,831,640).

With reference to **claims 1, 6, 7, 11, 16, and 17,** Shih et al. teaches a system of interactive evaluation of a geometric model (see abstract) comprising: a computer system including a memory (see column 7, lines 62-67), a processor (see column 7, lines 18-24), a user input device (10) (see column 38, line 60-column 39, line 12), and a display device (14); a computer generated geometric model stored in the memory of the

computer system (see column 7, lines 50-56); and a haptic interface (12) operatively in communication with the computer system (see column 7, lines 25-39), wherein said haptic interface includes a haptic device (10, 33) for transmitting information between a user and the geometric model, and wherein a haptic device position and orientation are acquired with respect to a surface of said geometric model (see column 8, lines 51-64), a closest point position and orientation on the surface of said geometric model at the closest point position and orientation is extracted (see column 37, lines 1-19), and a stick-to-surface force and a property feedback force are determined and applied to the haptic device to constrain a motion of the haptic device to stick to a virtual surface representing the surface of the geometric model, thereby constraining a hand of a user to always be on the surface to enable the user to explore and feel the geometric model (see column 37, lines 32-43). With further reference to **claims 4 and 15**, Shih et al. teaches a method of interactive evaluation of a geometric model (see abstract), said method comprising the steps of: acquiring a haptic device position and orientation with respect to a surface of the geometric model (see column 8, lines 51-64), wherein the haptic device is operatively connected to a haptic interface (see column 7, lines 9-12), and the geometric model is selected from a database stored in a memory of a computer system (see column 9, lines 54-63); determining a closest point position and orientation on the surface of the geometric model to the haptic device position (see column 12, lines 17-34); extracting a surface property at the closest point position and orientation (see column 37, lines 1-19); mapping the surface property of the closest point position and orientation into a vector (101) (see column 13, lines 48-14, line 19); determining a

stick-to-surface force and property feedback force using the surface property of the geometric model at the closet point position and orientation; and adding the stick-to-surface force and a property feedback force together to form an applied force (see column 37, lines 1-43), and applying the stick-to-surface force and property feedback force to the haptic device to constrain a motion of the haptic device to stick to a virtual surface representing the surface of the geometric model, thereby constraining a hand of a user to always be on the surface to enable the user to explore and feel the geometric model (see column 37, lines 32-43).

While teaching all that is required as explained above, Shih et al. also teaches the usage of a haptic rendering process (16) that translates the location of the haptic interface device (10) in real space into a corresponding location in the haptic virtual environment, which is the haptic interface location (98) (see Figure 3; column 11, lines 7-11), there fails to specifically teachings of mapping the haptic device position and orientation into a geometric model coordinate reference system; or mapping the surface property of the closes point position and orientation into the haptic device coordinate reference system.

However, the examiner takes Official Notice that allowing the translation of the location of the haptic interface device in real space into a corresponding location in the haptic virtual environment, as taught by Shih et al. (see column 10, lines 45-column 11, line 25), to represent the claimed model coordinate reference system as claimed in order to determine the position of the interface device in real space in order to control the virtual space interface device is well known in the art. Therefore it would have been

obvious to one having ordinary skill in the art to allow for the usage of a coordinate reference system suggested Shih et al. in order to determine the position of the interface device. With reference to **claims 6 and 16**, Shih et al. teaches the step of configuring the geometric model as a parametric surface (see column 10, lines 1-23), wherein a point (S) representing the model has a set of coordinates within a predetermined coordinate system, as explained above (see column 10, lines 45-column 11, line 25). With reference to **claims 7 and 17**, Shih et al. teaches including the step of orienting a haptic device position within a haptic device coordinate system (see column 10, lines 45-column 11, line 25). With reference to **claim 11**, Shih et al. teaches the step of mapping the surface property of the closest point position and orientation into the haptic device coordinate reference system, as explained above (see column 12, lines 17-34).

Therefore it is obvious to one having ordinary skill in the art at the time of the invention to allow the usage of a coordinate reference system as suggested by Shih et al. in order to allow the translation of the location of the haptic interface device in real space into a corresponding location in the haptic virtual environment thereby providing more accurate position detection of the haptic interface device.

With reference to **claims 2, 13, 14, and 20**, Shih et al. teaches the usage of a virtual reality display mechanism (14) operatively in communication with the computer system and the haptic interface so the user can see the geometric model in a virtual

environment; and the computer system, haptic interface, and virtual reality display mechanism are in communication with each other (see Figure 1; column 7, lines 1-8).

With reference to **claim 3**, Shih et al. teaches that the haptic interface tactilely conveys a surface property of the geometric model to a user through the haptic device and the haptic device is constrained to the surface of the geometric model (see column 37, lines 1-43).

With reference to **claim 5**, Shih et al. teaches the step of selecting a geometric model from a database in the memory of the computer system (see column 9, lines 54-63) prior to the step of acquiring the haptic device position and orientation (see Figure 3); wherein the geometric model is a computer-aided design model (see column 10, lines 1-23).

With reference to **claims 8 and 18**, Shih et al. teaches that the step of extracting a surface property includes the step of determining a surface normal at the closest point position and orientation (see column 14, lines 48-64).

With reference to **claims 9 and 19**, Shih et al. teaches that the step of extracting a surface property includes the step of determining a surface curvature at the closes point position and orientation (see column 37, lines 1-20).

With reference to **claim 10**, Shih et al. teaches that the step of mapping the surface property of the closes point position and orientation into a vector (101) after the step of extracting a surface property (see column 13, lines 54-63).

With reference to **claim 12**, Shih et al. teaches that the step of applying a stic-to-surface force and property feedback force includes the step of tactilely conveying a surface property of the geometric model to a user through the haptic device and constraining the haptic device to the surface of the geometric model (See column 36, line63-column 37, line 43).

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alecia D. Nelson whose telephone number is 571-272-7771. The examiner can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on 571-272-3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

5. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

adn/ADN
March 18, 2006

SUMATI LEFKOWITZ
SUPERVISORY PATENT EXAMINER